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添加多元胺 putrescine 對離體培養玉米子粒發育的影響
Effects of Putrescine Addition on Development of Maize (Zea mays L.) Kernel in vitro

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Abstract
本研究利用子粒離體培養方式獲知玉米子粒充實過程中之乾重量增加、含水量下降及多元胺含量的變化，均與田間果穗上之子粒發育過程的變化十分類似。子粒離體培養的培養基中添加 putrescine(PUT)的合成抑制劑 D- arginine (D-ARG)會抑制 PUT 合成，並顯著抑制子粒 R3 生長期乾物質蓄積能力；在 80 mM D-ARG 處理的培養基中若再添加 10 mM PUT，則可顯著增加子粒的乾物質蓄積能力。分析其代謝活性，發現 PUT 可部分恢復 D-ARG 所抑制的子粒可溶性糖、澱粉含量及改變糖類代謝酵素 UDP glucose pyrophosphorylase (UDPG-ppase) 及 phosphoglucomutase (PGM)的活性。該等結果暗示減少多元胺 PUT 含量會降低玉米子粒可溶性糖、澱粉含量及乾物質蓄積能力，其原因可能與 UDPG-ppase 及 PGM 等糖類酵素活性的改變有密切關係。

關鍵字：玉米; 子粒; 離體培養; 多元胺; 抑制劑; 酵素活性

Abstract

Maize（Zea mays L., hybrid TNG 1）was used to explore the relationship of polyamine contents and the ability of dry matter accumulation of kernel, and to examine the effects of polyamines on the enzymatic reaction of carbohydrate metabolism. Changes of dry weight, water content and polyamines contents in kernels cultured in vitro were similar to that in kernels in vivo. Both putrescine (PUT) and dry matter accumulation in kernel decreased significantly after incubation in medium containing D-arginine（D-ARG）, an inhibitor of PUT synthesis. However, applying of 10 mM PUT significantly increased the ability of dry matter accumulaion of the kernels cultured in medium containing 80 mM D-ARG. Examine the effects of PUT on carbohydrate metabolism, it showed that PUT could recovered the decreases of soluble sugar, starch contents and enzyme activities of sugar, i.e. UDP glucose pyrophosphorylase（UDPG-ppase）and phosphoglucomutase（PGM）, which were inhibited by D-ARG. The data suggested that inhibition of PUT synthesis would decrease soluble sugar, starch content and the ability of dry matter accumulaion of kernels by changing the enzyme activities of UDPG-ppase and PGM respectively.

Key words：Maize (Zea mays L.); Kernel culture; Polyamines; Inhibitor; Enzyme activity